

June 19, 2017

Valois Shea
U.S. Environmental Protection Agency, Region 8
Mail Code 8WP-SUI
1595 Wynkoop Street
Denver, CO. 80202-1129
By e-mail to Shea.valois@epa.gov

Dear Ms. Shea:

This letter provides comments from Clean Water Alliance on the EPA's draft Underground Injection Control permits for the proposed Dewey-Burdock uranium project, as well as the associated proposed aquifer exemption. We oppose the EPA's proposed issuance of permits and an exemption for the following reasons.

There are a number of problems with the EPA's documents and with the process surrounding the draft permits and draft exemption. The items we have identified as key issues are explained below. The first part of the comments will discuss the problems with EPA documents. We will then turn to the EPA process and omissions. Then we'll discuss environmental justice and National Historic Preservation Act issues. And finally, we'll consider other types of issues.

DOCUMENT ISSUES

A glaring problem with the EPA's documents on the proposed project is that large portions of the documents used to support the EPA's draft permits are based on other permits that do not exist or that were prepared inadequately. For example, the EPA's documents defer repeatedly to the NRC's SEIS for the Dewey-Burdock project. This document echoed Powertech/Azarga's submissions in all important respects, rather than the NRC taking a hard look at the situation. The EPA documents also refer repeatedly to the requirements of a state NPDES permit that has not even been applied for. And they refer frequently to a state Large Scale Mine Permit and a state Groundwater Discharge Permit (GDP) that have just barely begun the hearing process, are on hold, and are far from issuance.

To rely on non-existent regulatory instruments and what are essentially the applicant's documents for large portions of the permitting documents indicates both problems with the regulatory process and a lack of analysis of the proposed mine, deep disposal wells, and aquifer exemption. These non-existent "permits" are relied upon for major aspects of the proposed mine and associated facilities. For example, the GDP and NPDES permits are relied upon for statements that the land waste disposal option will be safe and that there will be no contamination. This runs counter to the research on this topic, which indicates a build-up of highly-toxic selenium at a similar site. And then the EPA signs off on Powertech's proposal to grow crops on the land disposal sites without any analysis of the safety of this practice for wildlife, domesticated animals, or humans. This is a problem.

Similarly, the EPA relies upon an “NPDES permit” that hasn’t even been applied for to discuss the Emergency Preparedness Program and Environmental Management Plan that are the basis of its discussion of impacts from spills and leaks, worker safety, and other topics. The agency concludes “Because the project site will be reclaimed and released for unrestricted use,” there won’t be impacts to land use. It’s a long way from a non-existent “permit” to full reclamation twenty years down the line. This use of speculative information should not be allowed as part of the application, cumulative effects, draft permit, or aquifer exemption documents.

Some other examples of the reliance upon non-existent “permits” for key aspects of the Cumulative Effects analysis can be found pages 36, 39, 51, 53, 54, 55 (3 times!), 60, 61, 67, 71, 72 (3 times!), 74, 75 (3 times!), 79, 83, 88, 96, 109, 125, 132, 137, 138, 139, 140, 142, and 143. Until if and when the suggested permits are issued, information based on non-permits should be omitted from the EPA’s documents. A realistic, complete EPA analysis should be done.

Perhaps the most important problem in the EPA’s documents has to do with the confinement of mining fluids in the Class III wells areas. This goes to the heart of the safety of the project, and to the heart of the future of the region. There are real doubts whether the mining fluids can be contained at the proposed mine site. As Dr. Hannan LaGarry’s research shows, there are around 7,500 old boreholes on the site, not the lower numbers put forward by the EPA or the company. This number comes from Dr. LaGarry’s direct observation of Powertech’s records (For further information, his e-mail address is hlagarry@olc.edu). Even the lower numbers indicate that it is unlikely that all old boreholes can be found and properly plugged. And the Class III draft permit is based on information that does not extend 1.2 miles outside the proposed project boundary (p. 36). Additional analysis is needed.

In addition, research by Boggs and Jenkins (“Analysis of Aquifer Tests Conducted at the Proposed Burdock Uranium Mine Site: Burdock, South Dakota,” 1980) indicated leakage across the Fuson shale between the Lakota and Fall River formations in the Burdock area; this is one of the TVA papers. The Class III Fact Sheet notes the connection between the Chilson and Fall River formations in the Dewey area, which was from the other TVA test done in the early 1980s. This found the Chilson member of the Lakota formation to be “exceptionally permeable,” as quoted by Dr. Perry Rahn (2014. “Permeability of the Inyan Kara Group in the Black Hills Area and its relevance to a proposed in-situ leach uranium mine” in the *Proceedings of the South Dakota Academy of Science*). Rahn, is Professor Emeritus at the South Dakota School of Mines and the acknowledged expert in matters related to hydrology in the southern Black Hills.

The EPA also notes that the Powertech pump test in the Dewey area was not only done differently, but that the TVA test was done at a pumping rate 16 times higher than the company test. This makes it look as though the company didn’t want to do much that might show a connection between formations in the Dewey area. A more comparable update of the Dewey study is needed.

Research by Wicks, Dean, and Kulander (“Regional tectonics and fracture patterns in the Fall River Formation (Lower Cretaceous) around the Black Hills foreland uplift, western South Dakota and northeastern Wyoming.” 2000) indicated that the Fall River formation is

“pervasively fractured” along the western edge of the Black Hills. The opinions of Dr. Robert Moran and Dr. Hannan LaGarry, which are included in the NRC proceedings and Exhibits, also indicate that fractures, faults, breccia pipes, and other geological characteristics of the project area, have not been adequately researched. The Class III Fact Sheet says that there are 64 drinking water, irrigation, and livestock wells in or within 1.2 miles of the mine boundary. To families on the ground, the situation is high-stakes, and this is not a game. It is critical that the geology of the area be fully understood – preferably before draft permits were issued – but certainly before any further steps are taken.

Research by Tank (1958. “Clay Mineralogy of Morrison Formation, Black Hills area, Wyoming and South Dakota,” *Bulletin of the American Association of Petroleum Geologists*”), which may be the only focused research on the Morrison formation in the Dewey-Burdock area, indicates that the formation’s thickness varies widely and that there is a “marked difference” between the formation’s composition in Edgemont and seven miles north of Edgemont. The draft permits’ heavy reliance on the Morrison formation as a confining layer should be re-considered, as the reality may not support the assumptions used in writing the draft permits. Making the Morrison Formation look thick in graphics and accepting the company’s word for its permeability is not enough (Class III Draft Permit, p. 20; p. 23).

Given the information that is available, and given the importance of this particular issue, it is irresponsible to conclude that mining fluids could be contained based on limited scientific information, weak analysis, and company documents. It is up to the EPA to get or create accurate, substantial, third-party and peer-reviewed information and to analyze it thoroughly before granting draft permits and aquifer exemptions.

Otten and Hall of the U. S. Geological Survey are among those who have observed that “To date, no remediation of an ISR operation in the United States has successfully returned the aquifer to baseline conditions” (“In-situ recovery uranium mining in the United States: Overview of production and remediation issues” at http://www-pub.iaea.org/mtcd/meetings/PDFplus/2009/cn175/URAM2009/Session%204/08_56_Otton_USA.pdf). Bill Von Till of the NRC issued similar sentiments when he said in August 2010 “to date, restoration to background water quality for all constituents has proven to be not practically achievable at licensed NRC IS[L] sites” (credited in another source to EIS for Moore Ranch ISR project, WY., p. B-36).

This is important partly because, typically, when companies can’t restore water to baseline conditions or to the standards set by the NRC, the NRC simply raises the amount of contamination allowed. At some point, the restoration water “fits” those raised standards, and the mine’s water is declared “restored.” This is unacceptable for the NRC, and it would be unacceptable for the EPA. The EPA must retain its baseline permit limits through a true restoration process. It is also important that standards are set at a true “baseline,” which is the original condition of the project area’s water prior to uranium drilling or mining.

Given these experiences in the real, on-the-ground world of ISL mining at modern mines in the United States, the presumptions of companies who propose this type of mining – and the brave statements by regulating agencies -- must be approached with abundant caution. If no U.S. ISL

mine has ever returned the water to baseline and if restoration to background has proven not achievable, what makes the EPA believe that this unprecedented task will be accomplished at Dewey-Burdock? This question must be addressed explicitly and analyzed thoroughly as a result of a full NEPA process, if the EPA decides to push forward rather than deny the permits and exemption.

Another document issue is located in the Class III Fact Sheet (p. 108). The EPA, following Section 2.2.2 of *The Unified Guide*, described performance standards that Powertech must follow in its statistical analysis of groundwater monitoring data. One of the standards is that, when using a tolerance interval or prediction interval, that interval must be “protective of human health and the environment.” The EPA should know that the science as to what is “protective” when it comes to in situ leach uranium mining is in dispute. There is very little science on the subject, and some of what has been done was completed with improper or inadequate methodology or was paid for by the uranium industry. Before any further steps are taken in working with this process, additional research needs to be completed.

These are some of the general problems with the EPA documents on the proposed project. Others will become apparent as we move into process issues and omissions.

PROCESS ISSUES

The basic process issue in this case has been the failure of the EPA to adhere to the NEPA process. While the NRC has attempted to follow that process for the possession of nuclear materials, its actions have not adequately covered a variety of issues that are under the EPA’s purview, particularly water issues. The EPA needs to complete its own NEPA process.

The applicant’s project has also changed in important respects between the time the NRC began considering it and the time the EPA began considering it. Examples include:

- NRC documents consider the use of 4,000 gallons of water per minute for the mining and reclamation process. The EPA applications consider the use of 9,000 gpm, more than twice as much water.
- This project was originally described as involving 1,500 injection, recovery, and monitoring wells. By the time the EPA issued its draft permits, this had grown to 4,000 wells, nearly three times more wells.
- The projected bleed rates have varied over time, from .5% of the water used to 17% of the water used. In addition, the reverse osmosis process makes at least 30% of the water put through the RO process into waste, and this is not fully considered in the EPA documents. This seriously weakens all the assumptions and calculations on water use in the Class III draft permit and in the Draft Cumulative Effects Analysis.
- Documents prepared by Petrotek for Powertech/Azarga set subsurface water movement rates at 6 to 7 feet per year (without offering peer-reviewed sources). NRC documents set the transmissivity rate in the Fall River formation at 255 ft.² per day and in the Lakota formation at 150 ft.² per day. Dr. Perry Rahn’s 2014 article, mentioned above, concluded that the average ground water velocity for the Lakota and Fall River formations in the

Dewey-Burdock area was 66.1 ft./year. But, he said, groundwater velocity in the Inyan Kara Aquifers at the Dewey-Burdock site might be as much as 5,480 feet per year – over a mile -- which “might indicate fast groundwater movement through very permeable units or through fractures,” although he considered this number “very high.” The draft permits omit this critical information that could have very real impacts on wells that are downgradient of the proposed mine site. This issue is critically important, and further independent studies should be done before any permit is issued.

- Powertech talked about the possibility of doing open pit mining at the NRC hearings, and this possibility is not raised in the EPA documents.

These changes in the parameters of the proposed project go to the heart of the information that informs the process in this case. The NRC and the EPA have had different projects submitted to them. The processes are not functional equivalents, and consideration of both projects would not be redundant – it would be sensible. The EPA should begin a thorough NEPA process to assess the project as it is currently proposed.

As part of any new or continued process, the EPA should consider more than one alternative action. Although there are places where more than one alternative is considered for a minor action, the major actions only offer one alternative – giving the company a Class III permit, a Class V permit, and an aquifer exemption.

The agency must also rely on its own work, not just the information provided by Powertech, for critical information such as the “maximum volume of liquid wastes injected into the deep injection wells during aquifer restoration” (Cumulative Effects, p. 76). This number is central to the discussion of the Class V wells and should be determined independently of the applicant. If this number is wrong, so are all the assumptions and mitigation measures offered in the draft permits and other project documents.

The EPA must also do thorough tribal consultation. The existing documents indicate that this process has barely begun, and yet draft permits have been issued. This makes a mockery of the consultation process, which should be completed well before draft permits are issued, so that the resulting information can be analyzed. The EPA must halt all further action until mutually-satisfactory, government-to-government consultation is completed. All cultural and historical properties must be identified by Lakota experts, who should be paid if they so desire, and given complete protection.

Another process issue is that EPA has gone through all sorts of contortions in its Fact Sheet on the Class V application in an attempt to define what is clearly a Class I well as a Class V well. The disposal would clearly take place above a USDW, the Madison formation, which is a large aquifer of broad use in the Black Hills. It is used by, among others, Edgemont and Rapid City. The EPA justifies its labeling of Class I wells as Class V wells by treating them as Class I wells for construction and monitoring purposes and by requiring the company to treat the injectate until it is “at or below radioactive waste standards” (Class V Draft Area Permit Fact Sheet, p. 8). The fear of many people in the area, as expressed in the public hearings, is that this is not sufficient, and our water would become irretrievably contaminated.

The other glaring process issue is that the EPA has rushed the process, creating draft permits and exemption without going through the proper rule-making process. This is the first time that the EPA has issued draft permits for Class III wells for an ISL uranium mine. It seemed to be in a hurry to do so. There has been extensive discussion of the process with the applicant and the uranium industry, resulting in a procedure, guidance, and draft documents. The draft permit and draft aquifer exemption documents often mimic others, including documents from the applicant, rather than creating a thoughtful analysis of the situation. (See Document Issues). However, there has been no public process on the de facto regulations created and used to craft the draft permits and draft exemption – no public notice, no public hearings, no analysis of public input. This violates the Administrative Procedure Act (APA), as well as the spirit of American government.

If allowed to stand, the entire process would fail to fully consider the project, provide adequate public input, leave western South Dakota with contaminated water, set a bad precedent for future proposed projects, and violate the APA. Process issues are not, however, the only shortcomings of the draft documents for the Dewey-Burdock project. There are also notable omissions.

OMISSIONS

Moving to omissions, there is no analysis – or even discussion – of whether it is possible to treat the quantity of water being used by this project to the required standards. If it is not – and if the process is not closely monitored – water will be permanently contaminated. There is no analysis or discussion of whether it is possible to treat the water quickly enough to keep up with the injection rate proposed by this project. And there is no analysis or discussion of the reverse osmosis facilities, their location(s) in the project area, or the impacts they would bring. This includes the fact that at least 30% of the water put through the RO process typically becomes waste water. The Class V Fact Sheet uses the number 30% (p. 50), but RO operations can create four gallons of waste water for every 1 gallon of treated water. This waste is commonly called “brine,” although the waste water in this project would be radioactive and full of heavy metals and would require further treatment before being disposed of as 11e waste.

There is also the question of whether RO treatment of all this water can be done economically, given the price of uranium (currently only \$19.25 per pound of yellowcake) and other project costs. A responsible agency would include a full discussion of the RO process and its impacts on the environment, waste treatment, bonding requirements, and the feasibility of the project. It would also provide numerous examples of places in which this operation has proceeded successfully at the flow rates and with the contaminants proposed by the company.

We contend that, if the RO process and the actual costs of full aquifer restoration were considered, this project would not be feasible economically, technically, or environmentally. The history of the uranium industry includes abandonment of almost 200 mines and prospects in the southern Black Hills and over 3,000 in the Upper Missouri River basin, plus thousands more in the Southwest. Given this history, the applicant should be forced to provide an economic analysis using current uranium prices that shows that this project is feasible before they are given permits or an exemption. They should also provide a copy of a contract with a buyer for the

uranium that would be produced at the mine. Even at a modern ISL mine, the Smith Ranch-Highlands mine in Wyoming, aquifer restoration took place for 10 years, and the water quality was about the same as when mining ended, according to a Violation issued by the Wyoming Department of Environmental Quality. Part of the reason appeared to be cost. This situation should not be allowed to happen again. A detailed analysis that includes strict, regular, on-site regulatory enforcement must be an important part of the permitting and exemption process.

The EPA wrongly leaves the completion of key tests until after a permit would be issued. These omissions include:

- wellfield delineation drilling,
- establishment of current water baselines,
- identification of faults,
- tests of the integrity of the confining zones,
- identification of leakage in the Fuson confining zone,
- how to deal with a 10" leaking TVA well,
- information on unsaturated groundwater flow (this should be done in real life, not using a model that can be easily manipulated),
- collecting drill cores to determine the characteristics of down-gradient aquifers' geochemistry,
- measurement of confining zone thickness,
- all of the work leading up to and including the Authorization Data Package Reports (Class III Fact Sheet, pp. 70-71),
- radiological impacts analysis (independent of Powertech analysis),
- demonstration of the effectiveness of vertical and horizontal monitoring systems,
- identifying and creating a contract for disposal for 11e wastes and solid wastes,
- the establishment of down-gradient compliance boundary wells (these should not be moved in case of an excursion, but should be maintained at their original locations), and
- pump tests.

It appears that additional drilling in the alluvial deposits to determine whether there is upwelling groundwater should also be done before further regulatory action is taken. The "several" drillholes suggested in the Class III Fact Sheet seems inadequate, but the number of drill holes is not specified (p. 39).

None of this information will be subject to public review or comment, and key information would become available only after permits have been granted. This turns the regulatory process on its head. All testing should be done, subject to professional review, public review and comment, before any draft permit or exemption is issued.

As part of this process, note that current conditions do not provide an adequate or accurate "baseline." All baseline measurements (ground and surface water, air, soil, sediment, etc.) should be defined as the original condition of the project area, before drilling and mining.

One of the questions that is raised by the public that is not answered in the EPA documents is whether there is any uranium left to mine in the project area, which was mined extensively in the

1950s – 1970s. Before the project goes any further, the company should be required to prove that there is the amount of ore present that it claims by providing information under close supervision by a knowledgeable regulator selected by the EPA. As stated above, this should occur before any final permit is issued. If the company balks at this requirement, it should be inferred that it is not committed to the project as designed, that it knows there is less uranium present than it has claimed, and/or that it expects the expenses of this activity to make the project unprofitable.

Moving to the nature of the ISL uranium industry, the Fact Sheets and Cumulative Effects documents do not discuss the uranium industry's record in relation to problems with the ISL process at other sites. This minimizes the many problems that the ISL industry has experienced and, thus, the potential problems from the Dewey-Burdock project. This makes the portions of the draft permit dealing with excursions and leaks inadequate, as well as sections about mitigation and reclamation.

For example, the Crow Butte ISL mine near Crawford, NE., has had 85 license violations and reportable incidents. These range from excursions to leaks and spills to wells failing integrity tests. One leak at this site was not found or dealt with for over two years, which makes a mockery of the EPA's great faith in gauges, sensors, alarms, and other hardware to identify leaks and related system problems.

If EPA staff look over the information about ISL mines and regulation at [[HYPERLINK "http://www.wise-uranium.org/umopusa.html"](http://www.wise-uranium.org/umopusa.html)] (WISE Uranium, "Issues at Operating Uranium Mines and Mills – USA," last updated April 19, 2017), it quickly becomes clear that excursions are "normal," as the former CEO of Powertech said in a public forum in Colorado, and that leaks of both pipelines and ponds are common. This indicates that both surface and ground water are at risk.

This source also documents the movement of mining fluid beyond the mine boundary at the Kingsville Dome ISL mine in Texas (Rice. 2013. "Excursions of Mining Solution at the Kingsville Dome In-Situ Leach Uranium Mine." *Austin Geological Society Bulletin*) and the Highland Uranium Project in Wyoming. A summary of this type of information can also be found at Daniel Simmons-Ritchie, "Troubled history" in the *Rapid City Journal*. September 23, 2013. A history of these issues in the northern Plains region can be found in Jarding. 2011. Uranium Activities' Impacts on Lakota Territory, *Indigenous Policy Journal*.

The EPA omits important issues from its Draft Cumulative Effects Analysis. Three that are glaring are the potential for mining wastes to be transported from other areas to Dewey-Burdock Class V wells, the presence of other uranium companies in the Black Hills, and the potential for uranium mining to expand onto Powertech/Azarga's contiguous claims on the Wyoming side of the state line (the Dewey Terrace project) and to the east on National Forest Service land. It's important to consider climate change, but it's also important to consider cumulative impacts that are on or adjacent to the proposed mine site.

According to communication you had with Fall River County Commissioner Joe Allen on March 24, 2017, the current draft Class V permit would allow other ISL uranium mines to send wastes

for disposal at the Dewey-Burdock site. These wastes could arrive without documentation or information on the origin of the wastes. First of all, wastes should not be brought to the Dewey-Burdock site from other sites under any conditions. This adds transportation risks to the scenario and makes our area a dumping ground. It is our position that pertinent South Dakota Statutes forbid this, and consideration and analysis of these laws should be part of the draft permit review process.

Second, if outside wastes are allowed to be brought to Dewey-Burdock, then their chemical composition, location of origin, mine of origin, company of origin, and other pertinent information should be required to be reviewed by EPA before transportation to Dewey-Burdock begins. This information should also be public, so people know what is arriving in our area. Testing should be required upon arrival to insure that the waste meets Class V water quality standards. All of this should have been part of the draft permits and Cumulative Effects Analysis. This is another example of why the current analysis is grossly incomplete.

As for other companies, there are 11 uranium companies that have expressed an interest in the Black Hills, and one – Peninsula Minerals – recently started an ISL mine on the northwestern edge of the Hills in Wyoming. If the Dewey-Burdock project is not abandoned and if Powertech acquires all the needed permits (at least 10 at last count, including the Clean Air Act permit), then this would be the first ISL mine in South Dakota. If Powertech is allowed to move forward – especially on such flimsy permitting documents – a precedent would be set. We do not want to open South Dakota to a stampede of ISL uranium mining companies, for all the reasons discussed in this document. However, for the EPA's documents to be complete, the existing Black Hills mine and the potential for a much larger number of ISL uranium mines must be fully considered. This need is even greater for the Class V draft permit, which might allow wastes from other mines to be injected into ground water in the Dewey-Burdock area.

And as for the third item, Powertech has claims to the east of the current project boundary, and it has contiguous claims just across the border in Wyoming. This is very clearly a topic that should be considered under any discussion of cumulative effects. According to our research, the company has approximately 744 federal claims in Wyoming, with the majority being across the border from the Dewey-Burdock project area.

Another important omission is that the draft permits beg the question of who is going to do on-the-ground regulation of the proposed mine and deep disposal wells. In 2011, the State of South Dakota suspended its ability to regulate in situ leach uranium mining, so it has no authority to do that regulation at this time. The NRC has two inspectors based in Texas, who visit ISL mines once or twice a year. There is no indication that their regulation can be complete or happen often enough to catch problems.

This is tremendously important. The draft permits include some very critical actions, such as testing the Minnelusa Aquifer to determine its water quality before deciding whether the company can proceed with deep disposal wells. This is a high-stakes test that would impact the future of the southwestern Black Hills. First, the water quality test should have been done under EPA's direct supervision before a draft permit was issued. If the Minnelusa's water turned out to be appropriate for drinking water, the time and expense of creating the application and the Class

V draft permit would have been avoided – as would have the stress on people in the area who use and rely on the aquifer.

Second, if the permit is issued, the testing of the Minnelusa aquifer's water should be done under EPA's direct supervision, rather than allowing the company to do a test in the areas of its choice using equipment it supervises, sending the sample to the lab of its choice, and expecting the people who use the Minnelusa Aquifer in the southern Black Hills to believe the results.

Similarly, the following must be done under the direct supervision of a knowledgeable regulator:

- pre-mining water quality testing in the proposed mining area,
- testing designed to determine the likelihood of down-gradient excursions,
- information underlying decisions about what holes and wells should be plugged,
- mitigation of air quality impacts,
- pump tests,
- well construction,
- reports on and handling of vehicle accidents involving hazardous or radioactive contaminants,
- groundwater level measurements,
- injection fluid characteristics,
- post-restoration monitoring,
- determination of the corrective response that must be taken when an excursion happens (this is currently left to the regulated company),
- well plugging and abandonment,
- analysis of radiological issues,
- disposal of hazardous wastes,
- regulation of a variety of soil issues (Section 7.0 of Draft Cumulative Effects Analysis),
- programs to minimize the impacts to land use,
- fugitive dust control, and
- all measurements related to the presence, monitoring, and impacts of excursions, and of attempts to measure or cure excursions.

Note that Raymond H. Johnson, the lead author of the two articles that are the basis for the section related to down-gradient excursions in the Class III Fact Sheet (p. 62), appeared as a speaker at an event hosted by Powertech that was designed to promote the Dewey-Burdock project. He worked for the USGS at the time, which gave the audience the impression that the USGS was promoting the project, according to people who were there. This occurred in Hot Springs and in Custer in the Spring of 2013. I note that he was also in communication with EPA staff on this project. He then went to work for a firm that serves the uranium industry. While the “revolving door” phenomenon is not uncommon as people move from government to the private sector – and sometimes back again – the impartiality of Mr. Johnson's research has been questioned by some people in the Black Hills. For more information, see <http://www.argusleader.com/story/news/2015/03/07/ex-federal-scientist-center-uranium-fight/24581135/>

On the topic of drilling, the Class V Fact Sheet says that the draft permit allows the company to “drill deeper in order to evaluate deeper sandstone units within the Minnelusa” (p. 15) and to drill to the Precambrian basement when drilling Well 1 (p. 41).ⁱ These processes should not be allowed. The Madison aquifer is directly below the Minnelusa aquifer, and the upper portion of the Madison aquifer is porous, containing many caves, fractures, and solution openings (Class V Fact Sheet, p. 18; USGS. 2002. *Atlas of Water Resources in the Black Hills Area, South Dakota*, pp. 24-25). If the company was careless or drilled just a bit too far, here would be no separation between the aquifers and potentially no containment of materials pumped into the deep disposal wells, and a major drinking water aquifer could be contaminated.

We do not want a repeat of what happened at Wasta, SD, about 50 miles east of Rapid City. There, a drill bit and 150’ section of equipment broke off when a driller was looking for oil. Groundwater can be exposed, creating a possible link between the Minnelusa and Inyan Kara formations, and plugging the resulting hole may be impossible. The State’s bond was wildly inadequate (*Rapid City Journal*, January 23, 2017 and March 17, 2017). We are not willing to take a risk that something similar could happen as a result of the proposed Dewey-Burdock project.

The EPA also omits information in its discussion of seismic factors in the Class V Fact Sheet. It states that it is “not aware” of a seismic event causing an injection well to contaminate a USDW or of studies done to determine whether such contamination has occurred (p. 54). It then lists states that have been studied on this issue. The list omits states with injection wells that have been linked – at least in the media -- to seismic incidents, including Oklahoma, North Dakota, and Pennsylvania. The EPA may be “not aware” of some of the research, but it should be held to a higher standard and required to do the relevant research before omitting important information.

We also searched the Class V Fact Sheet looking for a thorough discussion of the seismic characteristics of the proposed mining and injection area. The presence of faults in the immediate area is mentioned (pp. 22-23), but their potential impacts are never analyzed. Similarly in the Class III Fact Sheet, the mechanisms by which Fall River formation water comes up through the Dewey fault is never analyzed (p. 45).

At the end of the Class V Fact Sheet and the Draft Cumulative Effects Analysis, the EPA indicates that the Endangered Species Act will be complied with, but gives no information on how it intends to do this. When will this be done? What species will be considered? Who will do the analysis (not the company)? This should already have been completed before draft permits were issued.

The EPA mentions the presence of a short-horned lizard, which is rare and protected in South Dakota, in the proposed project area. After stating that the species is “important in some tribal cultures,” it offers the solution “Once construction activities begin at the site, the EPA expects that the [sic] any short-horned lizards that were in the area will seek less disturbed locations.” This is pure conjecture, without any back-up information on the size or habits of the lizards. Are they territorial, or is it species-appropriate for them to move? Are they large enough to move fast enough to out-run a bulldozer or pick-up truck? Or are they, in reality, unprotected?

This and similar information must be provided and backed by scientific research at the Dewey-Burdock site for this and other species. Animals should not simply be expected to move out of a site that's over 10,000 acres in a systematic and comprehensive process. And the EPA then expects them to just move back in after mining is complete – as if the same animals will be alive and remember their former homes after as many as 20 years. This is beyond unacceptable in the direction of ludicrous – and is certainly unacceptable.

Species other than animals are not considered in this discussion. Plants cannot simply move off the site. Some of them are important to tribal practices and customs, such as medicinal plants and timsila (prairie turnips). Full scientific information should be gathered, and full analysis must be done, for non-animal species. Species that are important to the long-term residents of the area -- the Lakota, Cheyenne, and other native nations – require special protection. There is already information on protection of some species in project documents that could serve as a base for part of this analysis. However, a full and independent analysis is also needed.

This analysis would include close consideration of the opinion of the South Dakota Department of Game, Fish and Parks. This opinion was stated in an October 17, 2008, letter written by Stan Michals. Michals said that exploratory activity should not take place on some parts of the project area between February and August (inclusive) due to the presence of a bald eagle nest (a state-protected bird) and a redtail hawk nest. Mining, deep disposal wells, land application, and reclamation, which are more long-lasting and disruptive than exploration, should clearly also not take place during those seven months of the year in raptor nesting and other protected areas.

The sturgeon chub must be included in the discussion of wildlife concerns. It is present in the Cheyenne River and may be threatened or endangered in areas downstream from the proposed mine. Additional silt, heavy metals, and radioactive materials would be potential threats.

Also missing from the Class III Fact Sheet is a reasonably believable analysis of the concerns surrounding abandoned uranium mines in the project area. Any discussion of a factual basis for this analysis would be reassuring. Instead, the document just asserts the number of old mines and their conditions. There are two drilling logs indicating the geological location for the two larger open-pit mines (where it is obvious), but for the other abandoned mines, their condition is simply asserted. Early uranium mining in the southern Black Hills was a “mom and pop” enterprise, and detailed records were not kept. Small abandoned mines or prospects could have escaped being recorded. One partial solution is to allow Dr. LaGarry a longer period of time in which to look over the drilling logs; his time was quite limited when he was given access to Powertech's records under an order from the NRC administrative judges.

There is one statement in the Class III Fact Sheet that created more questions than it answers. This is the statement that “Groundwater pumped to the surface during the pump tests will not be injected back into the subsurface” (p. 59). The obvious question, of course, is what will be done with this waste water? Will it be allowed to run into the ground and/or the creeks? What will its quality be? Is this waste water included in the calculations of the amount of water consumed during the project? At a minimum, the answers to these questions should be included in the discussion.

One omission is simply the failure to provide a very important definition in the section of the Class III Fact Sheet related to mechanical integrity. This is the statement that internal mechanical integrity and external mechanical integrity will both be confirmed if “There is no significant” leak or fluid movement. The document needs to provide a clear, measurable definition of “significant” in each case.

Another problem that has been common in the mine area and that is omitted from the EPA’s discussion is wildfires. There have been at least three large wildfires in the area in the last five years. The Crow Butte ISL mine – only about 65 miles from Dewey-Burdock -- was evacuated in 2012 due to a wildfire. The impacts on water, air, and land could be enormous, if a building containing nuclear materials, wellfields, or storage ponds were impacted by a wildfire. The discussion of cumulative effects must include a thorough discussion of how this type of problem would be dealt with to protect the land, air, and water.

The next omission is that the treatment of radiological wastes from the drying cycle at the Central Processing Plant is not specified. The Cumulative Effects Analysis says that “off-gases generated during the drying cycle will be filtered through a baghouse” (p. 86), and it also mentions a “sock filter” (p. 87). However, the document does not give any information on where or how the wastes in the filters/baghouse would be disposed. It is assumed that these wastes will be radioactive, so should probably be 11e wastes. But readers (and the company) should not have to guess about such things. This situation should be the subject of comprehensive analysis, and the entire waste cycle should be specified clearly. There is also no discussion of potential accidents during processing (which have occurred) or the remediation or mitigation that might be needed as a result.

Much of the mitigation sections appears to be vague, incomplete, or based on stock language picked from other documents, such as the discussion of soil impacts mitigation on page 78-79 of the Cumulative Effects Analysis. The mitigation sections of EPA documents should offer a complete and detailed analysis of the required mitigation that is site specific at the Dewey-Burdock location.

To top it off, the EPA makes use of the Draft Cumulative Effects Analysis difficult, as the document has neither a Table of Contents nor an Index. In the future – and before further action is taken on the proposed mine, Class V wells, and aquifer exemption -- we hope that the EPA will rectify this and the other omissions.

ENVIRONMENTAL JUSTICE AND NATIONAL HISTORIC PRESERVATION ACT ISSUES

The issues involving the EPA’s DRAFT Environmental Justice (EJ) Analysis and its National Historic Preservation Act (NHPA) report are linked and will be discussed briefly in this section.

The primary shortcoming of the DRAFT Environmental Justice Analysis is its limitation to a 20-mile radius. While it is true that Edgemont qualifies for impacted status, the 20-mile limitation effectively eliminates people who live downstream and on the Lakota reservations and who are

impacted by the destruction of treaty, historical, and cultural sites. Note that both EJ and NHPA analysis should have been completed as part of a full tribal government-to-government consultation before the draft permits or aquifer exemption were released. There has, at this point, already been a violation of trust by the EPA that will be difficult or impossible to remedy.

As part of its regulatory process, the EPA should require that old uranium mines in the Dewey-Burdock area be analyzed for potential Superfund status. This is critical not only to the people and animals who live in the area, but also for the company's employees. A uranium company should not be able to tell the federal government to "take a hike" when it controls known contaminated land through leases. Old mines that pollute the water and sediment for miles downstream with radioactivity and heavy metals should not be ignored, especially when area populations have well-documented increases in cancer and lowered life expectancy – both of which can be linked to higher levels of radioactivity. And whether or not the old mines reach Superfund status, they should be cleaned up before any new uranium mining is allowed.

The EJ analysis includes Table 12, which purports to list "Additional State and Federal Permits Powertech is required to obtain" (p. 24). This Table is misleading in several ways that make it look like the company faces few hurdles. First, the table does not include the Clean Air Act permit that the EPA says is required. Second, it does not indicate the current status of either the state water appropriation permits or the state Groundwater Discharge Plan. These permits have not just been "recommended for approval"; they have been put on hold for several years. And third, the NRC's Source Material License is under appeal in federal court, and this is not mentioned.

The EPA also states conclusions about the mining process and its outcomes that are not supported by experience or science in the EJ analysis. This is discussed elsewhere in these comments.

The EJ analysis mentions that the public in the White Mesa mill area, where the company wants to take its 11e wastes, is 49% American Indian and Native Alaskan. After making this statement, the agency fails to do an EJ analysis of that site, simply saying that the Dewey-Burdock waste would be a small percentage of the waste at the site. This begs the question – What are the impacts of the mill on the nearly half of the population of the area that should be protected under EJ guidelines? There should at least be a reference to a complete analysis of this issue and, if one doesn't exist yet, it should be done as part of the Dewey-Burdock process and before further action is taken by the EPA.

Turning to the NHPA document, EPA should not rely on the NRC's section 106 review and consultation. That process is grossly incomplete. A section 106 review should, of course, have been completed before draft permits or a draft aquifer exemption were issued. At this point, the EPA should conduct its own review to insure that different viewpoints are brought to bear on the situation and to insure that thorough work is done by the federal agencies that are involved in the Dewey-Burdock project.

The NHPA document also indicates that tribal consultation is in its infancy. Tribal leaders from the two reservations that are most likely to experience impacts from the Dewey-Burdock project,

the Oglala Sioux Tribe and the Cheyenne River Sioux Tribe, have not yet started consultation. Yet draft permits and a draft aquifer exemption have already been issued. This is a travesty, and it's difficult to see how the EPA can rectify the situation.

OTHER ISSUES

In addition to problems with documents, omission and process, there are statements that we simply disagree with in the EPA's project documents. First, the Class III Fact Sheet states, "There is no limit in the Class III Area Permit as to how many injection and production wells Powertech may construct" (p. 14). There certainly should be a limit, and that limit should be conservative and set by the regulator, i.e., the EPA. This should be corrected.

Another issue is that, because the EPA documents downplay the amount of water that would be consumed by this project, the cumulative impacts do not adequately consider the proposed project's use of large amounts of water. As a result, the EPA also does not adequately consider the actual drawdown of water or the long-term impacts that this water use could have on the environment and economy of the southwestern Black Hills. The southern Black Hills is a semi-arid area that will need all its ground water in the future. This need will grow with climate change and with the ongoing depletion of the High Plains (Ogallala) aquifer a bit to the south.

A third major problem is the admission that injectate from the Class V wells will mingle with Madison aquifer water and come to the surface 20 miles away. While the EPA says this will happen "on the scale of 10,000 years" in its Cumulative Effects Analysis, remember that the calculations of water movement underground at the Dewey-Burdock site vary widely. The information offered by Powertech's contractor suggests that water movement is many times slower than independent estimates. Also, there are other wells into the Minnelusa and Madison aquifers to the south and east, over the 20-mile span between the project site and Cascade Springs. This admission should negate the entire Class V application and send Powertech back to Canada, China, and the Cayman Islands.

The sections on ground water use in the Draft Cumulative Effects Analysis rely overly-much on the opinion of one person, the former South Dakota State Engineer. Other people should be consulted.

Next, the various types of ponds should not be built where there are old drillholes. Best practices should be followed for all ponds to avoid leakage either through the bottom or through flooding. This includes at least the following: thick, high-quality double liners, clay liners, leak detection systems, procedures for frequent checking of leak detection systems, and the maintenance of substantial empty space in the ponds to accommodate flood events.

It is not wise to build ponds in the 500-year floodplain, especially given the increase in flooding incidents in the area, and this practice should be proscribed. Similarly, the design of sediment control structures should protect from events larger than a 5-year, 24-hour precipitation event – especially because the mine and the ponds will be present for up to twenty years. This is a set-up for four spills from the ponds! This also goes to the EPA's finding that surface water impacts

“should be minimal.” They will not be minimal if a flood washes out sediment structures or over-tops a pond containing hazardous materials even once.

The statement that “radon-222 itself has very little radiological impact on human health or the environment” (p. 85, Cumulative Effects Analysis) runs counter to what can probably be called common knowledge. It certainly runs counter to the EPA’s website on the topic: [[HYPERLINK "https://www.epa.gov/radon/health-risk-radon"](https://www.epa.gov/radon/health-risk-radon)] The UIC Program needs to go back to the drawing board and do a comprehensive, science-based analysis of this issue.

Along the same line, in its discussion of the Central Processing Plant, the Cumulative Effects Analysis says both that “ventilations systems will exhaust outside the building” and that there will be “open doorways” on processing buildings (p. 86). One would hope that, for the safety of workers, the open doorways are nowhere near the exhausts. This should be specified by the EPA, and potential employees should be fully informed of the situation.

Section 3.3.1 of the Cumulative Effects Analysis (p. 19) is vague on key aspects of the impacts that will occur to ground water quality in the ore zone. The second-to-last sentence of this section say that the company “will monitor groundwater using standard industry practices.” This is repeated in the section on post-restoration monitoring (p. 22). These standard practices, of course, have been associated with all sorts of problems, including the ongoing failure to return even one ISL mine’s water to baseline. The EPA can do better.

Similarly, the section ends with a statement that the EPA “concludes that impacts to ore zone water...should be minimal.” How is “minimal” defined? Is it what the EPA will allow? Is it minimal to the company? Or is it minimal to the impacted communities? This term should receive better explanation.

We also disagree with the statement in Section 3.3.2.1, in which the EPA says that an excursion can be left as is, if it is not corrected within 60 days; instead, the company can increase its financial assurance obligation in a manner that is suitable to the NRC (p. 21). This is not acceptable.

In addition, the EPA should not rely on the NRC’s analysis, recommendations, or regulations. The processes by the two agencies should be independent, so that the proposed mine, disposal wells, and aquifer exemption receive the benefits of the expertise and different regulatory focuses of both agencies.

Next, deep disposal well integrity should be tested at least once per year, not as infrequently as every 5 years, as EPA suggests in the Class V Fact Sheet (p. 56). And injectate should be monitored and analyzed regularly, as the characteristics of wellfields will differ, and as the functioning of the RO system may also vary in effectiveness. Records should be maintained until at least five years after the end of the project, in case problems develop over time, not for as little as three years, as the Fact Sheet suggests (p. 59).

Similarly, EPA calculations indicate that “the pressure within the Minnelusa injection zone resulting from injection activity is **not** [bold in original] below the critical pressure needed to

move fluids out of the Minnelusa injection zone into the Madison Formation” (p. 28). The EPA correctly requires the company to recalculate in light of this fact, but must also hold firm if the resulting injection rates are even near the critical pressure, with the potential result that the permit would not be granted. Again, it is critical to protect the Madison aquifer, and the nature of the upper portion of that aquifer is particularly concerning due to the presence of rapid water movement.

In addition, all boreholes and old uranium mines on the full project area should be plugged and reclaimed before any further mining is allowed. Not only does this protect the water, soil, and air of the area, but it also protects workers who would be exposed to the old, open mines. Abandoned open pit uranium mines spread contamination through the water, sediment, and air, as shown by research done by Dr. James Stone of the South Dakota School of Mines and Technology and others.ⁱⁱ The old mines must be reclaimed, and the soil, air, and water must be tested to insure that it is safe before allowing any new uranium mining to go forward.

As mentioned above, modeling is a weak alternative to on-the-ground testing. The EPA should certainly not rely exclusively on models for any decision or requirement in the case of such a complex, controversial project – especially models developed by or for Powertech. There should be independent analysis of any information currently left to modeling. As the EPA notes in the Cumulative Effects Analysis, “there is inherent uncertainty in the results” (p. 108) when modeling is involved.

There should also be clarification of the length of time that the proposed Dewey-Burdock project would be active. This goes directly to the potential impacts of the project. The estimate in the State Mining Permit Application is seven to 20 years of uranium recovery, maybe more, with the Central Processing Plant likely to operate longer. The Class III draft permit is for the “operating life of the facility” (p. 7). At 14 wellfields, each operating for two years, this could be as long as 28 years, if the company ran them consecutively. There is also the potential for the company to expand the project to include its contiguous claims to either the east or west of the current project area. There’s a difference between regulating a project that lasts seven years and regulating a project that lasts over 20 years. As stated repeatedly, the draft permits and Cumulative Effects Analysis should discuss the full range of potential impacts and scenarios.

There are two statements in the Class III Fact Sheet that apparently involve the EPA being prescient. Especially given the critical topics that these statements are about, they should, instead, be made factual. The first is that “the Lower Chilson is expected to provide adequate confinement...” (p. 66), and the second is that “The distance between the Chilson Sandstone potentiometric surface and the targeted ore zone...is expected be [sic] adequate to allow the drawdown required...” (pp. 68-69). These statements should be proved, not “expected” into existence.

There is also a question about the rate of pumping of water during the mining process. In Section 5.2.1 of the Draft Cumulative Effects Analysis, the text says that the “header piping [would be] designed to accommodate injection and production flow rates of 2,000 gpm...” (p. 56). On the next page, the document says that there would be 100 wells per header house. The schedule for the project indicates that as many as five wellfields will be active at one time. As

each wellfield is likely to have more than 100 wells, these numbers add up to more than the 8,500 gpm that the company has asked to use in its more recent documents. This situation needs to be carefully researched and analyzed before any further action is taken on the proposed project.

A final issue is the demonstration of financial responsibility by the company, which the Class III Fact Sheet says should be done through a surety bond “or other adequate assurance” (p. 129). The only assurance that should be accepted is an adequate surety bond. The value of the company, if there is any, should not be used to demonstrate financial responsibility.

The definition of an “adequate” surety bond is critical. As noted above, in western South Dakota and elsewhere, it has been common historically for uranium and other mining companies to be unable to fund full restoration after mining, to go bankrupt, and to leave the burden for taxpayers – if restoration was even technically feasible.

In the case of in situ leach uranium mining, the Wyoming Department of Environmental Quality (DEQ) raised the bonds at the Highland and Smith Ranch ISL mines from \$38,416,500 to \$80,000,000, after it discovered that restoration attempts were not having any effect. In its March 10, 2008, Notice of Violation, the DEQ indicated that the real cost of restoration would be “on the order of \$150 million.” Regulators of other ISL projects should heed the Wyoming experience and insure that bonds for all activities that are associated with this technology are adequate, especially since full restoration has never happened. It is our position, based on the history of the uranium industry, that uranium mining cannot be done safely.

This is especially important because Powertech has already admitted that its restoration could be incomplete. In a 2014 “Restoration Action Plan” submitted to the NRC, the company said that “elevated concentrations above the restoration criteria may remain in the production zone following restoration,” which the company called “hot spots.” The company suggests that, after further study, the “hot spots” could be ignored and the “well field be declared restored.” This is unacceptable, and the EPA should explicitly prohibit this practice.

We support the conclusion of EPA’s statutory analysis that the Dewey-Burdock mine is subject to the Clean Air Act and subpart W. If the project goes forward, we request that public education sessions and public comment periods be held as part of the subpart W regulatory process.

The citizens of the area that would be most impacted by this project spoke loudly and clearly at the hearings in April and May. As many as 700 people attended the hearings. 212 people spoke (omitting duplicates in Valentine and Rapid City, but counting duplicates in Hot Springs and Edgemont). Of those 212 people, only 15 (7%) supported the proposal to mine uranium in the Black Hills and in our water supplies. The vast majority – 93% -- opposed the project. In a democracy, the will of the people counts.

The EPA should act consistently with the voices of the vast majority of the people at the hearings, rather than approving a project that is poorly considered, ill-advised, full of gaps, and

dangerous to the health, the economy, the cultural resources, and the environment of the Black Hills.

Clean Water Alliance respectfully requests that the EPA halt the permitting processes for the proposed Dewey-Burdock project by denying the permits and the exemption.

Sincerely,



Lili Jones-Jarding, Ph.D.
President, Clean Water Alliance
P. O. Box 591
Rapid City, S.D. 57709
(605) 787-2872
[HYPERLINK "http://www.bhcleanwateralliance.org"]
lilijsjarding@gmail.com

ⁱ Note that if these drilling activities are actually allowed to proceed, there should be a provision that makes the resulting information public.

ⁱⁱ Onyeukwu, Kyrian. 2007. *Assessment of Wind- and Soil-Related Hazards Associates with Abandoned Uranium Mines in the North Cave Hills, Harding County, South Dakota*. Master's Thesis, S.D. School of Mines and Technology; Stone, James, and Larry Stetler. 2008. Environmental Impacts from the North Cave Hills Abandoned Uranium Mines, South Dakota. *Uranium, Mining and Hydrogeology*; Tuombe, Emmanuel. 2008. *Surface water and sediment investigation concerning abandoned uranium mines in the South Cave Hills, North Cave Hills, and Flint Buttes region, Harding County, South Dakota*. Master's Thesis, S.D. School of Mines and Technology; Albertus-Benham, Hannah. 2009. *Surface water and sediment investigation concerning abandoned uranium mines within the Slim Buttes region, Harding County, South Dakota*. Master's Thesis, S.D. School of Mines and Technology; Stone, James, Larry Stetler, and Albrecht Schwalm. 2007. *Final Report: North Cave Hills Abandoned Uranium Mines Impact Investigation*. Prepared for U.S. Department of Agriculture: Forest Service-Region I, Missoula, MT. at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3834131.pdf; Sharma, Rohit, and James Stone. 2013. Chemical composition of bottom sediments within black hills region reservoirs of South Dakota and Wyoming. *Environmental Earth Sciences*.